Space Weather Forecast

Issued on Friday, 06 May 2022 at 13:07 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

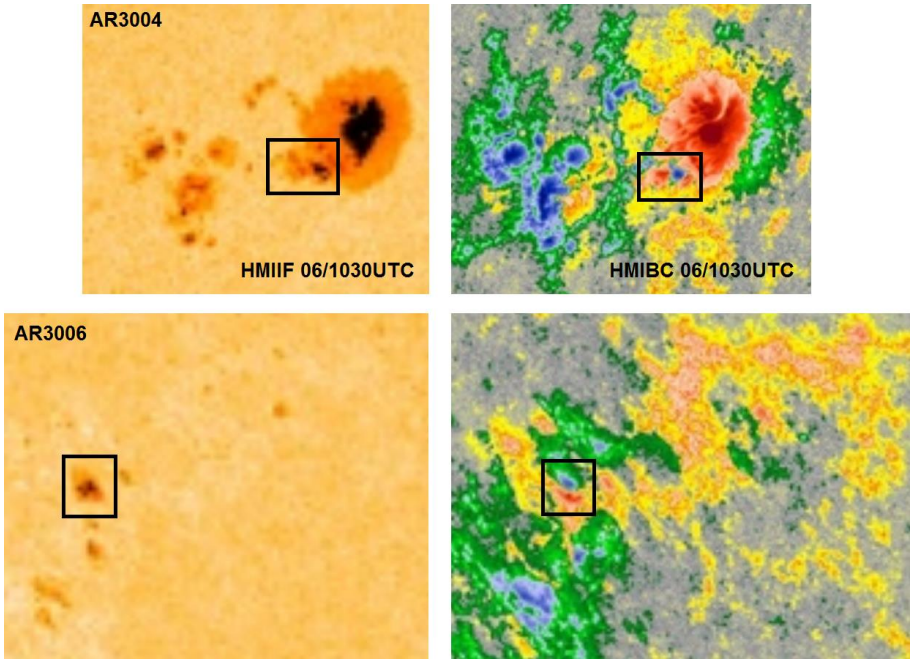
---

Space Weather Forecast Headline: Further Minor/Moderate radio blackouts from X-ray flares likely, slight chance of Strong.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has remained moderate over the past 24 hours, with frequent common-class activity observed, but with a decreased intensity compared to the preceding 24-hour period. Activity peaked with a lower-end moderate class flare at 05/1316 UTC from the largest sunspot group, slightly exceeded at 05/1410 from another moderate flare from a growing region on the southeast of the sun. These regions had shown a possibly coincidental tendency in the recent past to flare at similar times and with similar cadence, despite their large separation on the facing side of the sun, although this effect became less noticeable with time. Growth trends in both were slow, with the largest showing some fading as its eastern compatriot showed some proliferation to go some way to making up for its nominally smaller stature. There are up to three other sunspots on the sun, all small, stable or fading and without significant flares to their name.

Figure 1: Visible and magnetic satellite imagery of the two largest and most active sunspot regions on the facing side of the sun. Shown boxed are 'delta' spots (under the Mt Wilson classifcation system). A delta spot is recognised as two 'umbrae' (dark spots) of opposing magnetic polarity (red next to blue) in *close proximity* within one large (orange) penumbra. This state of affairs is generally unstable and is an indicator of likely flare activity.



Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.

There are numerous 'filaments' (arcs of plasma) occupying the facing side of the sun at present - one of the largest of these (located in the central northern solar hemisphere) showed possible partial disappearance around 06/1100UTC. It is not clear whether this left the immediate solar environment at the time of writing, with no Earth-directed Coronal Mass Ejections (CMEs) visible in available satellite imagery.

Solar Wind / Geomagnetic Activity: The solar wind followed a slow regime, with the solar wind speed at within background, perhaps with a slight rising trend overall. The number of particles and their associated magnetic field were both stable and unremarkable, going some way to explaining quiet resulting geomagnetic activity.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Further moderate-class X-ray flares are likely from the two largest and most complex sunspot regions, with a daily slight chance of strong class. A new and potentially active sunspot region appears likely to rotate onto the southeastern solar horizon within the next day or two. Meanwhile, no large groups leave the sun, meaning a possible rising trend in risk pending any arrivals for analysis.

Solar Wind / Geomagnetic Activity: No coronal holes feature in this forecast. Reanalysis of a disturbance from the vicinity of the largest sunspot while it was angled at Earth at 1700UTC on 03 May has resulted in a low confidence CME with an Earth-bound component, with arrival most likely late on 07 May or possibly into early 08 May. There is a peak chance of Minor Storm G1 from this event, else geomagnetism should remain quiet.

Energetic Particles / Solar Radiation: Solar radiation storms are felt to be unlikely in the period, however there is a daily slight chance of S1 or above, largely as a result of the largest sunspot's westward advance.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	30	40	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.